Remarks

Applicants thank the examiner for the courtesy of a telephone conference on March 31, 2004 to discuss the rejection based on 35 U.S.C. §112. In light of the discussion, claims 1, 2, 4 and 5 have been amended. No new subject matter is believed to have been added.

To assist the Examiner, applicants would like to point out that an endonuclease is so named because of the particular organism from which it is first isolated and hence is endogenous to. For example, MseI is endogenous to a particular *Micrococcus species* strain (NEB446, also known as ATCC No. PTA-2421). MnlI is endogenous to a particular *Moraxella nonliquefaciens*, MlyI is endogenous to a particular *Micrococcus lylae*. NEB catalog 2002-2003 pg 46 and 47 is attached hereto to illustrate this. It can be seen from these two pages that 3 different Micrococcus restriction endonucleases are described from different strains each with a different cleavage site and encoded by different DNA sequences. Of these endonucleases, only the DNA encoding MseI is obtainable from ATCC PTA-2421.

Objection under 37CFR § 1.83(a)

The Examiner has queried Figure 1 with respect to the Brief Description of Figure 1B. The Examiner has further objected to the absence of "A" and "B" on Figure 1.

This description provides verification of the cleavage activity of MseI on DNA from cells transformed with the M.MseI (pVR-18). The results of this experiment are reported in detail in Example IV and

present Figure 1. Consequently, applicants have deleted the description to Figure 1b and modified the text on page 16 to remove the "A". With the present modifications, no further alteration to the Figure 1 itself is necessary.

Rejection under 35U.S.C. §112 first paragraph

The Examiner objects to claim 1 prior to amendment because of the reliance on a specified Micrococcus species. Consequently, applicants have amended claim 1 to require that the DNA be obtainable from the ATCC deposited strain (PTA-2421) which is a recombinant *E.coli* containing the DNA encoding the restriction endonuclease produced by the specified Micrococcus strain.

In the telephone conference with the Examiner on March 31, 2004 , the language "obtainable from" as applied to a DNA encoding a restriction endonuclease was discussed. It was agreed that the term "obtainable" is descriptive when used in the context of a recombinant DNA in a deposited recombinant clone of *E.coli* wherein the specification further provides sequences for the recombinant DNA encoding the claimed endonuclease and methylase.

The amendment in claim 1 in which the DNA encoding the specified restriction endonuclease is obtainable from a deposited recombinant *E.coli* is supported by an adequate description in which the DNA sequence is included in the specification. The significant feature of the invention as claimed is a novel and non-obvious DNA which is characterized very specifically by a sequence and by a deposited recombinant *E.coli*. The possibility that the isolated DNA

may be derived from native sources in addition to those specified does not detract from the description of the isolated DNA molecule.

Any person of ordinary skill in the art can obtain the DNA from the deposited strain or related isolate in light of the description in the specification without any undue experimentation. Moreover, anyone of ordinary skill in the art based on the description in the specification would be able to use the DNA sequence disclosed in the present application to conduct a GenBank search and to identify the isolated DNA in its native context.

The Examiner has rejected claims 3-6 because of the missing statement in the deposit requirements. Applicants have amended the specification on Page 61 to state (1) that the deposited material will be available to the public on issuance of the patent and (2) the address of the depository.

For the reasons set forth above, Applicants respectfully submit that the rejections set forth in the Official Action of October 30, 2003 have been overcome and that this case is in condition for immediate allowance. Early and favorable consideration leading to prompt issuance of this Application is earnestly solicited.

Applicants petition for a three-month extension of time in which to file this response. Please charge deposit account no. 14-0740 in the amount of $475. Applicants authorize that any additional fees that may be due be charged against this account number.

Should the Examiner wish to discuss any of the amendments and/or remarks made herein, the undersigned Attorney would appreciate the opportunity to do so.

Respectfully submitted,

NEW ENGLAND BIOLABS, INC.

Date: April 5, 2004

Harriet M. Strimpel, D.Phil
(Reg. No. 37,008)
Patent Counsel
32 Tozer Road
Beverly, Massachusetts 01915
(978) 927-5054 X373

ORDERS order

Mbo I

RH NE3 37° Dam

#R0147S 500 units $60
#R0147L 2,500 units $240
for high (50X) concentration, order #R0147M (2,500 units)

5′...▼GATC...3′
3′...CTAG▲...5′

Source: An *E. coli* strain that carries the cloned Mbo I gene from *Moraxella bovis* (ATCC 10900)

Reaction Conditions: NEBuffer 3
100 mM NaCl, 50 mM Tris-HCl, 10 mM $MgCl_2$, 1 mM dithiothreitol (pH 7.9 @ 25°C). Incubate at 37°C.

Ligation and Recutting: After 100-fold overdigestion with Mbo I, > 95% of the DNA fragments can be ligated and recut.

Concentration: 5,000 and 25,000 units/ml. Assayed on λ DNA (*dam*⁻).

Storage Conditions: (pH 7.4), 0.1 mM EDTA, BSA and 50% glycerol.

Diluent Compatibility:

Heat Inactivation: 65

Note: Dpn II and Sau3A Mbo I cleaves to leave a be efficiently ligated into Dpn II or Sau3A I cleaved

Blocked by *dam* methylation isoschizomer Sau3A I is genomic DNA is impaired methylation (see p. 252).

Mbo II

RH NE2 37° Dam

#R0148S 250 units $55
#R0148L 1,250 units $220

5′...GAAGA(N)$_8$▼...3′
3′...CTTCT(N)$_{7}$▲...5′

Source: An *E. coli* strain that carries the cloned Mbo II gene from *Moraxella bovis* (ATCC 10900)

Reaction Conditions: NEBuffer 2
50 mM NaCl, 10 mM Tris-HCl, 10 mM $MgCl_2$, 1 mM dithiothreitol (pH 7.9 @ 25°C). Incubate at 37°C.

Ligation and Recutting: After 10-fold overdigestion with Mbo II, approximately 50% of the DNA fragments can be ligated. Of these, > 95% can be recut.

Concentration: 5,000 units/ml. Assayed on λ DNA (*dam*⁻).

Storage Conditions: 50 mM (pH 7.4), 0.1 mM EDTA, 1 mM BSA and 50% glycerol. Store

Diluent Compatibility: Dilue

Heat Inactivation: 65°C for 20

Note: Mbo II produces DNA fra single-base 3′ extension which are ligate than blunt-ended fragments. ligation can be achieved by using (NEB #M2200).

Blocked by overlapping *dam* methy

Incubations longer than 1 hour are not

Mfe I

RH NE4 37°

#R0589S 500 units $60
#R0589L 2,500 units $240

5′...C▼AATTG...3′
3′...GTTAA▲C...5′

Source: An *E. coli* strain that carries the cloned Mfe I gene from *Mycoplasma fermentans* (N.F. Haiden)

Reaction Conditions: NEBuffer 4
50 mM potassium acetate, 20 mM Tris-acetate, 10 mM magnesium acetate, 1 mM dithiothreitol (pH 7.9 @ 25°C). Incubate at 37°C.

Ligation and Recutting: After 20-fold overdigestion with Mfe I, > 95% of the DNA fragments can be ligated and recut.

Concentration: 10,000 units/ml. As

Storage Conditions: 50 mM NaCl, 10 (pH 7.4), 0.1 mM EDTA, 1 mM dithiothreitol, 200 BSA and 50% glycerol. Store at –20°C.

Diluent Compatibility: Diluent A, see p. 237.

Heat Inactivation: 65°C for 20 minutes.

Note: Mun I is an isoschizomer of Mfe I.

Not sensitive to *dam*, *dcm* or mammalian CpG methylation.

Mlu I

NE3 37°

#R0198S 1,000 units $55
#R0198L 5,000 units $220

5′...A▼CGCGT...3′
3′...TGCGC▲A...5′

Source: *Micrococcus luteus* (IFO 12992)

Reaction Conditions: NEBuffer 3
100 mM NaCl, 50 mM Tris-HCl, 10 mM $MgCl_2$, 1 mM dithiothreitol (pH 7.9 @ 25°C). Incubate at 37°C.

Ligation and Recutting: After 10-fold overdigestion with Mlu I, > 95% of the DNA fragments can be ligated and recut.

Concentration: 10,000 units/ml. Assayed on λ DNA.

Storage Conditions: 100 mM NaCl, 10 mM Tris-HCl (pH 7.5), 0.1 mM EDTA, 1 mM dithiothreitol, 200 µg/ml BSA and 50% glycerol. Store at –20°C.

Diluent Compatibility: Diluent A, see p. 237.

Heat Inactivation: 65°C for 20 minutes.

Note: Cleavage of mammalian genomic DNA is blocked by CpG methylation (see p. 252).

Cloned at NEBiolabs RH Recombinant Enzyme

BSA Requires BSA

Mly I

Source: An *E. coli* strain that carries the cloned Mly I gene from *Micrococcus lylae* (NBL 2048)

Reaction Conditions: NEBuffer 4 + BSA
50 mM potassium acetate, 20 mM Tris-acetate, 10 mM magnesium acetate, 1 mM dithiothreitol (pH 7.9 25°C). Supplement with 100 µg/ml BSA. Incubate at 37°C.

Ligation and Recutting: After 20-fold overdigestion with Mly I, approximately 75% of the DNA fragments can be ligated and recut.

Concentration: 10,000 units/ml.
Assayed on λ DNA.

Storage Conditions: 50 mM KCl, 10 mM Tris-HCl (pH 7.4), 0.1 mM EDTA, 1 mM dithiothreitol, 200 µg/ml BSA and 50% glycerol. Store at –20°C.

Diluent Compatibility: Diluent A, see p. 237.

Heat Inactivation: 65°C for 20 minutes.

Note: Mly I is an isoschizomer of Ple I that generates blunt-ended DNA fragments.

Not sensitive to *dam*, *dcm* or mammalian CpG methylation.

#R0610S	1,000 units	$55
#R0610L	5,000 units	$220

5′...GAGTC(N)$_5^{\nabla}$...3′
3′...CTCAG(N)$_{5\Delta}$...5′

Mnl I

Source: An *E. coli* strain that carries the cloned Mnl I gene from *Moraxella nonliquefaciens* (ATCC 17953)

Reaction Conditions: NEBuffer 2 + BSA
50 mM NaCl, 10 mM Tris-HCl, 10 mM $MgCl_2$, 1 mM dithiothreitol (pH 7.9 @ 25°C). Supplement with 100 µg/ml BSA. Incubate at 37°C.

Ligation and Recutting: After 2-fold overdigestion with Mnl I, approximately 50% of the DNA fragments can be ligated. Of these, > 95% can be recut.

Concentration: 5,000 units/ml.
Assayed on λ DNA.

Storage Conditions: 200 mM KCl, 10 mM Tris-HCl (pH 7.5), 0.1 mM EDTA, 1 mM dithiothreitol, 500 µg/ml BSA and 50% glycerol. Store at –20°C.

Diluent Compatibility: Diluent B, see p. 237.

Heat Inactivation: 65°C for 20 minutes.

Note: Mnl I produces DNA fragments that have a single-base 3′ extension which are more difficult to ligate than blunt-ended fragments. More efficient ligation can be achieved by using the Quick Ligation Kit (NEB #M2200).

Not sensitive to *dam*, *dcm* or mammalian CpG methylation.

#R0163S	250 units	$55
#R0163L	1,250 units	$220

5′...CCTC(N)$_7^{\nabla}$...3′
3′...GGAG(N)$_{6\Delta}$...5′

Msc I

Source: An *E. coli* strain that carries the cloned Msc I gene from *Micrococcus* species (C. Polisson)

Reaction Conditions: NEBuffer 4
50 mM potassium acetate, 20 mM Tris acetate, 10 mM magnesium acetate, 1 mM dithiothreitol (pH 7.9 @ 25°C). Incubate at 37°C.

Ligation and Recutting: After 20-fold overdigestion with Msc I, > 95% of the DNA fragments can be ligated and recut.

Concentration: 3,000 and 15,000 units/ml.
Assayed on λ DNA.

Storage Conditions: 150 mM KCl, 10 mM Tris-HCl (pH 7.5), 0.1 mM EDTA, 1 mM dithiothreitol, 200 µg/ml BSA and 50% glycerol. Store at –20°C.

Diluent Compatibility: Diluent B, see p. 237.

Heat Inactivation: 65°C for 20 minutes.

Note: Msc I is an isoschizomer of Bal I.

Blocked by overlapping *dcm* methylation (see p. 253). The single Msc I site in pBR322 overlaps a *dcm* methylation site; consequently, pBR322 which has been grown in a dcm⁻ host should be used for cloning.

#R0534S	250 units	$55
#R0534L	1,250 units	$220

for high (5X) concentration, order #R0534M (1,250 units)

5′...TGG$^{\nabla}$CCA...3′
3′...ACC$_{\Delta}$GGT...5′

Mse I

Source: An *E. coli* strain that carries the cloned Mse I gene from *Micrococcus* species (R. Morgan)

Reaction Conditions: NEBuffer 2 + BSA
50 mM NaCl, 10 mM Tris-HCl, 10 mM $MgCl_2$, 1 mM dithiothreitol (pH 7.9 @ 25°C). Supplement with 100 µg/ml BSA. Incubate at 37°C.

Ligation and Recutting: After 5-fold overdigestion with Mse I, > 95% of the DNA fragments can be ligated and recut.

Concentration: 4,000 and 20,000 units/ml.
Assayed on λ DNA.

Storage Conditions: 50 mM NaCl, 10 mM Tris-HCl (pH 7.4), 0.1 mM EDTA, 1 mM dithiothreitol, 200 µg/ml BSA and 50% glycerol. Store at –20°C.

Diluent Compatibility: Diluent A, see p. 237.

Heat Inactivation: 65°C for 20 minutes.

Note: Not sensitive to *dam*, *dcm* or mammalian CpG methylation.

#R0525S	500 units	$55
#R0525L	2,500 units	$220

for high (5X) concentration, order #R0525M (2,500 units)

5′...T$^{\nabla}$TAA...3′
3′...AAT$_{\Delta}$T...5′

BSA Requires BSA · Methylation Sensitivity · Heat Inactivation · Blue/White Certified